Siberian Mathematical Journal 2006 vol.47 N3, pages 555-573

Operads and varieties of algebras defined by polylinear identities

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Abstract

We show that varieties of algebras over abstract clones and over the corresponding operads are rationally equivalent. We introduce the class of operads (which we call commutative for definiteness) such that the varieties of algebras over these operads resemble in a sense categories of modules over commutative rings. In particular, the notions of a polylinear mapping and the tensor product of algebras. The categories of modules over commutative rings and the category of convexors are examples of varieties over commutative operads. By analogy with the theory of linear multioperator algebras, we develop a theory of C-linear multioperator algebras; in particular, of algebras, defined by C-polylinear identities (here C is a commutative operad). We introduce and study symmetric C-linear operads. The main result of this article is as follows: A variety of C-linear multioperator algebras is defined by C-polylinear identities if and only if it is rationally equivalent to a variety of algebras over a symmetric C-linear operad. © 2006 Springer Science+Business Media, Inc.

http://dx.doi.org/10.1007/s11202-006-0067-9

Keywords

Algebra, Identity, Operad, Rational equivalence, Variety